



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

$$\therefore x = \frac{1}{2}[3 \pm \sqrt{5}] \text{ or } x = \frac{1}{2}\{-2 \pm \sqrt{[-6] \pm \sqrt{[-6 \mp \sqrt{(-6)}}]}\}.$$

Also solved by *JOHN M. ARNOLD, GEORGE D. BIRKHOFF, M. E. GRABER, J. SCHEFFER, L. C. WALKER, and H. C. WHITAKER.*

GEOMETRY.

THE PYTHAGOREAN THEOREM.

In the supposed "new proof" of the Pythagorean Theorem by Dr. Loomis, which was published last month, there appears a glaring fallacy. A number of our readers have written to us, saying that they do not understand Dr. Loomis' reasoning. The fact is, that the proof as published begs the question. That is, what is desired to be proved, is assumed. Dr. Loomis says that he had a purpose in this. He says he desired to turn the attention of thinkers to the graph submitted. The fallacy entirely escaped our notice until our attention was called to it by several of our contributors. Dr. Loomis' fallacy lies in this: If $4ar + 4r^2 > \text{ or } < 2bc$, then $a^2 + 4ar + 4r^2 > \text{ or } < b^2 + 2bc + c^2$, by adding $a^2 = b^2 + c^2$.

Now we know that $a^2 + 4ar + 4r^2 = b^2 + 2bc + c^2$. Hence, if it is assumed that $4ar + 4r^2 > \text{ or } < 2bc$, the only warranted conclusion is that $a^2 < \text{ or } > b^2 + c^2$.

Prof. B. F. Yanney says that such reasoning as employed in the proof given by Dr. Loomis would make $4ar = b^2 + c^2$ or $4r^2 = b^2 + c^2$, or even $r^2 = b^2 + c^2$.

We publish the following direct proof by Professor Sawyer, which we believe will stand the test of sound reasoning. Similar direct proofs were received from W. H. Carter, D. E. Lehman, Anna L. Benschoten, and Hon. Josiah H. Drummond.

Direct proof by F. L. SAWYER, B. A., Mitchell, Ont.

Connect O with the vertices A , B , and C .

$$a + 2r = b + c \dots (1).$$

$$\therefore 2a + 2r = a + b + c.$$

$$\therefore 4ar + 4r^2 = 2r(a + b + c).$$

Now the sum of the areas of the triangles AOB , BOC , COA = area of triangle ABC .

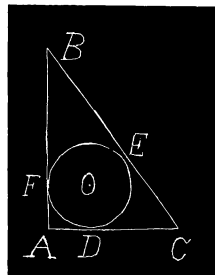
$$\therefore \frac{1}{2}r(c + a + b) = \frac{1}{2}bc \dots (2).$$

$$\therefore 2r(a + b + c) = 2bc \dots (3).$$

$$\therefore 4ar + 4r^2 = 2bc \text{ by substituting (1) in (3).}$$

$$\text{But since } a + 2r = b + c \therefore a^2 + 4ar + 4r^2 = b^2 + c^2 + 2bc.$$

$$\therefore a^2 = b^2 + c^2.$$



Problem 153, Geometry, is erroneous, it should read as follows:

If P, P', Q, Q' , are the extremities of two chords of a conic section passing through the focus, A , and at right angles to each other, show that the sum of the squares of the reciprocals of AP , AP' , AQ , and AQ' is constant.